53168-500301D3

IN THE CLAIMS:

1. – 43. *cancelled*

44. *(currently amended)* A method of operating a computer processor, the computer processor using computer software, the computer software being configured to simulate both the electrical characteristics and the optical characteristics of a silicon-on-insulator an (SOI)-based integrated optical/electronic circuit, the method comprising:

a) simulating operation of at least certain electronic circuit components of said SOI-based integrated optical/electronic circuit using an electronic design portion of the computer software to generate as outputs dopant profiles, topology information and free-carrier concentration information and time-dependent variations in the free-carrier concentration as a function of applied voltage;

b) applying the output information from the electronic design portion of the computer software as inputs to an optical design portion of the computer software to extract top-level optical parameters such as optical loss, optical phase and extinction; and

c) eo- simulating both the electrical and optical behavior of said integrated optical/electronic circuit through said electrical and optical computational engines to predict the optical behavior of said SOI-based integrated optical/electronic circuit.

45. – 46. *cancelled*

47. *(previously presented)* The method of claim 44, wherein the electronic design portion of the computer software includes at least one of the group consisting of a process simulation portion, a device simulation portion, a layout portion, a parasitic extraction portion, and a circuit simulation portion.

48. *(previously presented)* The method of claim 44, wherein said optical design portion of the computer software further comprises at least one of the group consisting of: a finite difference time domain (FDTD) portion, a beam propagation method portion, and a raytracing portion.

2

53168-500301D3

49. – 54. *cancelled*

55. *(previously presented)* The method of claim 44, wherein the optical design portion of the computer software partially models a waveguide included in said at least certain optical circuit components of the SOI-based integrated optical/electronic circuit.

56. *(previously presented)* The method of claim 55, wherein the SOI circuit includes a substrate layer, and wherein the waveguide at least partially extends within said substrate layer.

57. *cancelled*

58. *(previously presented)* The method of claim 44, wherein the electronic design portion of the computer software simulates at least one electronic circuit component from the group of a p-n device, a field plated device, an avalanche photodiode, a Schottky device, a MOSCAP, and a MOSFET.

3